BLIP Raster Risk List

BNL Raster AIP Risk List

	WBS	Description	Type of Risk	Consequence	Likeli-hood	Cost Impact (burdened $k)	Risk Expiration	Mitigation Plan	Notes
High Risk									
Medium Risk	1.0	Availability of personnel and other resources	Schedule	Level2	Likely		1QFY16	Use of overtime, contract labor	after funding is received and a start date is known, begin redefining near term resources with individual names (where possible) and forward to individuals and their supervisors.
	1.0	The tunnel in the area where this equipment will be installed is a high radiation area. Damage to equipment may occur, including the laser for the laser profile monitor, motors and other mechanical devices, cables, connectors, etc.	Cost	Level2	Likely		3QFY14	Engineering time is included for consideration of high radiation issues.	System design must include a balance between researching and installing radiation-hardened devices vs. periodic replacement of equipment that is expected to fail due to high radiation. As part of the design process, equipment testing must be performed in the high radiation environment to study potential failure modes. For example, motor controls and fiber optic cables can be installed in the BLIP tunnel to test the radiation effects. Consider design for laser transport system to minimize radiation exposure - shielding, locating laser outside tunnel, etc.
	1.2.1	Beam position monitor system not capable of measuring BLIP beam, which is mostly debunched by the time it reaches the BLIP beamline.	Technical	Level1	Unlikely		1QFY15	Engineering development includes 30% contingency to account for design uncertainty.	Testing revealed that a stripline BPM typical of that installed in the linac does not produce a measureable signal with the nearly debunched BLIP beam. This is because the llast accelerating RF tank for the BLIP beam is tank 5 (of 9), which is a long distance from the BLIP beam line. An alternative BPM device will be required, possibly requiring signficant R&D work. In addition, the Beam Position Monitor electronics must be capable of measuring beam motion while rastering over the 450 microsecond bunch length. The 200 MHz beam structure and possible low signal levels presents technical challenges.
	1.3	The high radiation environment of the BLIP tunnel coupled with a changeable and short (~3-4 months) access period will make installation scheduling challenging.	Schedule	Level 2	Likely		1QFY17	Initally plan for 3 Installation opportunities over 3 years. Add tasks (and dates) to the schedule to define equipment and material at subsystem level which will be installed in the BLIP Control Room. Develop a detailed tunnel installation schedule approximately 3 months before each tunnel access period.	Items will be installed in 2 locations; the BLIP tunnel, and its Control Room. Cables running from one to the other will connect some equipment. BLIP typically stops running in June or July, access is permitted 4 weeks after that to allow radiation levels to decrease. BLIP start up can occur in Dec or January. Access to the tunnel is not permitted when the Linac runs beam for NSRL (NASA Space Radiation Laboratory), normally for 2-3 weeks each fall.
Low Risk	1.0	Electronic signal measurements are hampered by EMI noise.	Technical	Level3	Likely		3QFY15	Engineering time is included for consideration of EMI issues.	Good signal noise reduction techniques will be essential in the electronic design.
	1.2.1	Malfunction of interlock system could cause BLIP target damage if system does not raster beam as expected.	Technical, Cost	Level2	Unlikely		4QFY15	A robust interlock system must be designed, and is included as part of this proposal.	The interlock system must inhibit beam to the BLIP target if the beam is not rastering. Confirmation that the system is rastering as expected will require monitoring a combination of signals including beam current transformer, power supply currents, beam position monitor and laser profile monitor. Options for robust operation require significant consideration.
	1.2.2	Ceramic beam tube fabrication for raster magnet	Cost, Schedule	Level2	Unlikely		1QFY15	Choose experienced vendor, optimize design based on vendor's experience, order a spare.	Choose experienced vendor, optimize design based on vendor's experience, order a spare.
	1.2.1	The Laser Profile Monitor can not scan the beam while the beam is rastering.	Technical	Level3	Unlikely		1QFY15	Engineering development time is included for this requirement. 30% contingency is included to account for design uncertainty.	Determine effects of beam movement on the measurement. Determine if the laser can be scanned quickly to provide several measurements during one 450 microsecond bunch, and/or if averaging can be used to provide a profile of the full beam raster motion.
	1.2.1	Locating electronic equipment outside the tunnel (to avoid radiation damage) may require fairly long cable lengths. Signal integrity with long cable lengths may be an issue.	Technical	Level3	Likely		3QFY14	Contingency is included to consider signal integrity issues.	The design must weigh the sacrifices between installing electronics in the tunnel and risking potential damage due to radiation, and signal integrity issues due to processing low level signals with long cable lengths.
	1.0	Availability of penetrations and adequate radiation shielding from tunnel to BLIP control room.	Cost	Level3	Lilkely	$100,000	4QFY14	Contingency is included in case more work than anticipated is required to provide penetrations and adequate radiation shielding.	Penetrations appear to be available from the BLIP control room where the racks will be located to the tunnel below. Specific radiation shielding requirements have not yet been fully studied.